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(पहला पुनरीक्षण)

Indian Standard

HYDRAULIC FLUID POWER — CYLINDERS — BORE AND ROD AREA RATIOS

(First Revision)

ICS 23.100.20

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

January 1999

Price Group 2

Basic Fluid Power Sectional Committee, PE 14

NATIONAL FOREWORD

This Indian Standard (First Revision) which is identical with ISO 7181 : 1991 'Hydraulic fluid power — Cylinders — Bore and rod area ratios' issued by the International Organization for Standardization (ISO), was adopted by the Bureau of Indian Standards on the recommendations of the Basic Fluid Power Sectional Committee and approval of the Production Engineering Division Council.

This standard was first published in 1984 by adopting ISO 7181 : 1982. The ISO Standard has since been revised as ISO 7181 : 1991. To align this standard with International practices, the Sectional Committee (PE 14), dealing with the subject has decided to revise IS 11146 : 1984 by adopting the above ISO Standard as dual number Indian Standard.

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. One component of such systems is the hydraulic cylinder. This is a device which converts power into linear mechanical force and motion. It consists of a movable element, that is, a piston and piston rod operating within a cylindrical bore.

In the adopted standard certain terminology, conventions and method of presentation are not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker in the International Standard while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard reference appears to International Standard for which Indian Standard also exists. The corresponding Indian Standard which is to be substituted in its place is listed below along with its degree of equivalence for the edition indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 5598 :1985 Fluid power systems and components — Vocabulary	IS 10416 :1992 Fluid power systems and components — Vocabulary (*first revision*)	Identical

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off the numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

HYDRAULIC FLUID POWER — CYLINDERS — BORE AND ROD AREA RATIOS

(First Revision)

1 Scope

This International Standard specifies for each pair of diameters (AL = cylinder bore; MM = piston rod diameter) of hydraulic cylinders a corresponding standard ratio φ between the useful areas A_1 and A_2.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5598:1985, *Fluid power systems and components — Vocabulary.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 5598 apply.

4 Area ratios

Dimensions are shown on figure 1 and given in table 1.

NOTES

1 For each pair of diameters (AL, MM) there is a corresponding ratio φ between the useful areas A_1 and A_2.

$$A_1 = \frac{\pi}{4} AL^2$$

$$A_2 = \frac{\pi}{4} \left(AL^2 - MM^2\right)$$

2 Table 1 gives, for guidance, for each value of AL those standard values of MM that give ratios φ approximately equal to one of the following preferred numbers:

1,06 — 1,12 — 1,25 — 1,4 — 1,6 — 2 — 2,5 — 5

3 Moreover, for each pair (AL, MM), table 1 gives calculated values of A_1 and A_2 and the corresponding effective value of φ.

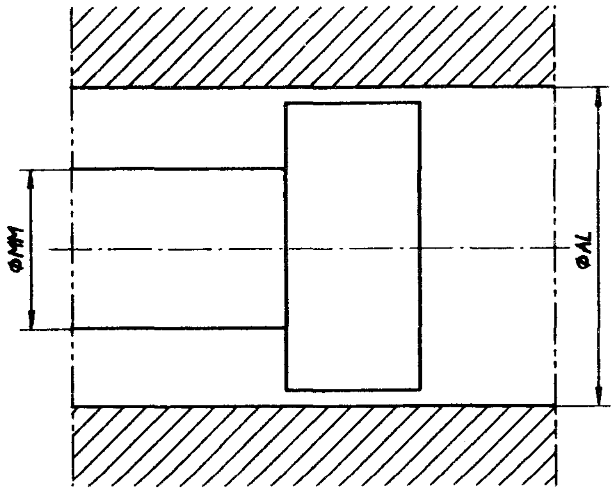

Figure 1

5 Identification statement (Reference to this International Standard)

Use the following statement in test reports, catalogues and sales literature when electing to comply with this International Standard:

"Hydraulic cylinder area ratios conform to ISO 7181, *Hydraulic fluid power — Cylinders — Bore and rod area ratios.*"

Table 1 — Bore and rod area ratios

Diameters in millimetres
Areas in square centimetres

φ[1]	AL	25	32	40	50	63	80	(90)	100	(110)	125	(140)	160	(180)	200	(220)	250	(280)	320	(360)	400	(450)	500
≈	A_1	4,91	8,04	12,6	19,6	31,2	50,3	63,6	78,5	95	123	154	201	254	314	380	491	616	804	1 018	1 257	1 590	1 963
1,06	MM				12	16	20	22	25	28	32	36	40	45	50	56	63	70	80	90	100	110	125
	A_2				18,5	29,2	47,1	59,8	73,6	88,9	115	144	188	239	295	355	460	577	754	954	1 178	1 495	1 841
	φ				1,06	1,07	1,07	1,06	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,06	1,07
1,12	MM			12	16	20	25	28	32	36	40	45	50	56	63	70	80	90	100	110	125	140	160
	A_2			11,4	17,6	28,0	45,4	57,5	70,5	84,9	110	138	181	230	283	342	441	552	726	923	1 134	1 436	1 762
	φ			1,10	1,11	1,11	1,11	1,11	1,11	1,12	1,11	1,12	1,11	1,11	1,11	1,11	1,11	1,12	1,11	1,10	1,11	1,11	1,11
1,25	MM	12	14	18	22	28	36	40	45	50	56	63	70	80	90	100	110	125	140	160	180	200	220
	A_2	3,78	6,50	10,0	15,8	25,0	40,1	51,1	62,6	75,4	98,1	123	163	204	251	302	396	493	650	817	1 002	1 276	1 583
	φ	1,30	1,24	1,25	1,24	1,25	1,25	1,25	1,25	1,26	1,25	1,25	1,24	1,25	1,25	1,26	1,24	1,25	1,24	1,25	1,25	1,25	1,24
1,4	MM	14	18	22	28	36	45	50	56	63	70	80	90	100	110	125	140	160	180	200	220	250	280
	A_2	3,37	5,50	8,77	13,5	21	34,4	44	53,9	63,9	84,2	104	137	176	219	257	337	415	550	704	877	1 100	1 348
	φ	1,46	1,46	1,43	1,46	1,48	1,46	1,45	1,46	1,49	1,46	1,48	1,46	1,45	1,43	1,48	1,46	1,48	1,46	1,45	1,43	1,45	1,46
1,6	MM	16	20	25	32	40	50	56	63	70	80	90	100	110	125	140	160	180	200	220	250	280	320
	A_2	2,90	4,90	7,66	11,6	18,6	30,6	39	47,4	56,5	72,5	90,3	123	159	191	226	290	361	490	638	766	975	1 159
	φ	1,69	1,64	1,64	1,69	1,68	1,64	1,63	1,66	1,68	1,69	1,70	1,64	1,60	1,64	1,68	1,69	1,70	1,64	1,60	1,64	1,63	1,69
2	MM	18	22	28	36	45	56	63	70	80	90	100	110	125	140	160	180	200	220	250	280	320	360
	A_2	2,36	4,24	6,41	9,46	15,3	25,6	32,4	40,1	44,8	59,1	75,4	106	132	160	179	236	302	424	527	641	786	946
	φ	2,08	1,90	1,96	2,08	2,04	1,96	1,96	1,96	2,12	2,08	2,04	1,90	1,93	1,96	2,12	2,08	2,04	1,90	1,93	1,96	2,02	2,08
2,5	MM	20	25	32	40	50	63	70	80	90	100	110	125	140	160	180	200	220	250	280	320	360	400
	A_2	1,77	3,13	4,52	7,07	11,5	19,1	25,1	28,3	31,4	44,2	58,9	78,3	101	113	126	177	236	313	402	452	573	707
	φ	2,78	2,57	2,78	2,78	2,70	2,63	2,53	2,78	3,03	2,78	2,61	2,57	2,53	2,78	3,03	2,78	2,61	2,57	2,53	2,78	2,78	2,78
5	MM				45	56	70	80	90	100	110	125	140	160	180	200	220	250	280	320	360	400	450
	A_2				3,73	6,54	11,8	13,35	14,9	16,5	27,7	31,2	47,1	53,4	60	66	111	125	188	214	239	334	373
	φ				5,26	4,76	4,27	4,76	5,26	5,76	4,43	4,93	4,27	4,76	5,26	5,76	4,43	4,93	4,27	4,76	5,26	4,76	5,26

NOTE — Values in parentheses are non-preferred values and should be used only for special applications.

1) $\varphi = \frac{A_1}{A_2}$ $A_1 = \frac{\pi}{4} AL^2$ $A_2 = \frac{\pi}{4} \left(AL^2 - MM^2\right)$

Annex A
(informative)

Bibliography

[1] ISO 3320:1987, *Fluid power systems and components — Cylinder bores and piston rod diameters — Metric series.*

Bureau of Indian Standards

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